

Plan: Decisions in the Dark
Emphasis throughout on describing/predicting/explaining/understanding reflective choices
(this should lead, if successful, to better advice in the end).

Ignorance: Suppose there are no agreed, measured, determined, stable, known,

frequencies: I Rule out minimax, Hurwicz, minimax regret, for all but very atypical cases (not because they violate axioms, but because strictly applied they lead to decisions that violate intuition and common observation) & Shackle. (Precisely when they violate axioms).

II Subjective probs, does not easily lead to counterintuitive choices.

Axioms support plausibility, and claim to "rationality."

Axioms 1-10 give Principle of Insufficient Reason. 5-scale

Explain most of Knightian phenomena. Case of "great uncertainty" covered by uniform or "nearly uniform" probs, high "information content", high variance, etc. Curvature of utility explains ^{some} different "gambler personalities"; behavior ruled out by utility axioms seems bizarre, ~~the~~ not reasonable or likely.

III But probability axioms rule out behavior that is less bizarre.

Examples. Conflicts show up when there is low information; not merely when there is lack of agreed frequencies. This justifies making the distinction.

IV Minimax, Hurwicz, minimax regret still do not explain this sub-class of phenomena. But Hurwicz-Hodges-Debreu do. Why? Verbal/intuitive ~~explanation~~ explanation of what people are doing; moral/pragmatic "justification." (Minimax, Hurwicz, as special, unlikely cases; ~~minimax regret is even more special case, unless you take on relevant Bayes as special, important case~~). Concept of "insurance." Engineering safety factors (Note: usually)

V Closer critique of axioms (now that they are "known" to be unacceptable).
 Implication of assumption that people use H-L decision rule for actions
 of stochastic choice and Chipman's results (H-H-L rule explains latter,
 nothing else, including Chipman or Raiffa theories, does). Relation to
 Shackle, Knight.

VI Implications for utility axioms: Winning at Russian Roulette.

VII ~~On~~ Gambling Personality: diminutions and varieties. Varieties of
 Gamblers. ("Conservatism" often applies² to slope - pos or neg - of
 utility function in direction away from "status quo"; b) to curvature
 of utility far from status quo; c) to quasi-pessimism (related or not
 to "conservative" payoffs in sense (2).) Pragmatic implications of different
 personalities. EVIDENCE on authentic thinking. H-H-L rule as
 descriptive device. Value of information

VIII Achievement levels. Status differences. 1-2 etc. Entrepreneurial
 types. Knight; free enterprise. Willingness to underwrite
 projects, undertake R+D "Conservatism/pessimism dimension"

IX Value of info, to different types under different circumstances.
 Willingness to underwrite projects, undertake R+D, launch new ventures.

X Societal differences, in stat. distribution of these types, and their
roles. Knight, on virtues of free enterprise; ~~make them~~^{give} control to those
 willing to bear responsibility; this will attract unsatisfied (✓)
 unsatisfied, and bold ($X > \frac{1}{2}$) types, and responsibility will make them more useful;
 knowledge of opp's acts hence, decision progress.

IX cont: Entrepreneurial type in development; 15-ack. On in war (Chambray) or guerrilla war (Guevara, etc; audacity). But not where he can do irreparable damage by one decision (pitland).

(IX might be appended to VII-VIII). Class/status differences; Markowitz; level of aspiration. (Note; an individual can be "satisfied"; but there are goals at all levels, ^{in social expectations.})

X Gambler in Conflict. All these styles might be represented in bargaining.

Game as decision problem with ambiguity. Effect of payoffs on expectation: H-L rule as representing this dependence in zero-sum case with known payoffs; and as reflecting quasi-dependence in non-zero-sum case, esp. when opponent's payoffs are unknown, or his knowledge of one's own is unknown in zero-sum case.

Note that assumption that one knows opponent's V-N-M payoffs implies much knowledge about opponent (Marshall). And so does assumption that one knows opponent's set of alternatives, what he considers possible or relevant (just like assumption that one knows relevant "event" in San against Nature). Why do I rule out "conceivable" enemy strategies as impossible or irrelevant? i.e. how do I even manage to abstract a game-formalization of a real conflict situation? Must be by judgments of "likelihood" — but why only 0 or 1?

(Vs. minimax: inclusion of an "enemy" strategy (event) in model implies that range of ambiguity includes non-zero likelihoods — perhaps including 0 as well. Why represent this range by 0 — or act as if one did? There will usually be a "more representative" non-zero dist; like $\frac{1}{n^2}$, etc).

Effect of threat, ambiguity.

XI Group Decision Problem under ignorance. Savage; kill minimax regret.

Bargaining on a team. Value of info. Org. theory (MacArthur in Korea). Importance of feedback on decision by subordinates.

XII Implication for deterrence.

(When is "bad" activist thinking more likely? Stability. Tension.

Uses of ambiguity in policy and dangers.

(We would like to make nuclear war appear an irrational (very non-optimal) choice from any set of ^{SV} alternatives, under any circumstances (and to make circumstances very unlikely when nuclear war would appear optimal for US, if SV doesn't make it irrational for US under all circumstances; this assumes that nuclear war cannot be made to look "good" for US). But our degree of assurance that we have succeeded, and our degree of assurance that SV will act rationally, will vary for different circumstances and different sets of SV alternatives. Hence, for any given program of deterrence, we are interested in reducing the likelihood of those situations in which likelihood of SV rationality or US deterrence (note: "deterrence" in broad sense can fail in 2 ways) is lower. This goal may conflict, in some cases, with probability (SV deterrence | ^{given} SV rationality) as a function^D of (circumstances + SV alternatives)

i.e. prob of SV strike is a function of $\left[\begin{matrix} 1 \\ D; \text{pr} (SV^2 \text{ rationality} | \\ \text{circumstances}); \text{pr} (SV^3 \text{ strike} | \text{irrationality, circumstances}), \\ \text{probability of circumstances} \end{matrix} \right]$

= prob of ^Arational SV strike + prob of ^Birrational SV strike

First term depends on (1, 2, 4), second on (2, 3, 4).

Circumstances (4) are those that might affect A or B (perhaps both, in opposite directions). RAND has concentrated on (1). (advising retaliation). (3) may be correlated with (1), if "non-rational" behavior is less likely.

But if we consider different kinds of SU strike, as we must if we want to improve outcome of war, (1) + (3) become more complicated. (and (2) may depend on (1) (2) may depend on the US actions that include (1)).

We may want to use our imagination to invent alternatives for SU that look "good" and are acceptable to US; and to invent ways of increasing the likelihood of SU rationality. Being given ("there") situations: e.g. ways of reducing SU ignorance, slowing SU decision to commit, ...).

[Unsolved problems: 1) Why do people "commit" themselves? (suppose this means: they stop paying a fee to keep a certain alternative available).
2) Significance of threshold probs: critical risks.

Ground rules for arguing with dissoners:

Try to stipulate:

- 1) US has a number of goals/interests, though some may be more important than others; don't start by assuming it has only a "#1" task, or that the "#1 task" has overwhelming priority.
- 2) Although a great range of strategies/instruments should be regarded as "potentially available" (at a cost in time, money, effort, ingenuity, other goals/instruments), it should not be assumed that these are all available in a given situation; alternatives are to some extent given in a given situation, though the choice may not be as restricted as some see it.

If these assumptions aren't accepted, argument can have little relevance to actual Presidential decision.

Accepting 1 rules out line of argument that action I is of no interest because it doesn't effect X, or is inherently "bad" because it goes against X.

2) rules out argument that action I must be rejected because it leads to "bad" results; that doesn't mean that there are always "better" alternatives available (though it motivates search for better alternatives, given time) or that the one alternative we haven't examined closely must be better, or "good."

Priorities of importance of goals are at up rate only as a rough indication of "trade" among different criteria (ignoring complementarities) but as a guide to the search process among alternatives; which criterion should be "looked at" first, how much must first criterion be "fulfilled" before second criterion is looked at (allowed to "count").

Individual/organization doesn't necessarily "have" lexico-graphic utilities; constraints of time (and other costs of search) force it to act "as if" it had this simple ordering of goals. If it did "have" these simple goals — same ordering of outcomes when it has "lots of time" to choose — it would be optimizing, not satisficing, with time constraint irrelevant; if it is conscious of effect of time constraint, it may be optimizing w.r.t. that constraint.

In latter case, it is taking a risk ^{a)} of stopping the search "too soon," accepting an alternative much worse than others that might be found; b) of rejecting an alternative "too soon," ~~when~~ because it "looks bad" on an early criterion, when later search it might ^{have} compared favorably with later alternatives considered w.r.t. other criteria, or even w.r.t. that one.

Chances of (b) can be reduced by increasing "memory" & "retrieval" capabilities, so that it is not necessary to "reject" alternative irretrievably (e.g. can store an indication of why it was rejected in easy-access memory) (even with small memory, alternative isn't usually "discarded" until something else is found that is better w.r.t. that one criterion on which looks "inadequate").

("Badness" of later alternatives w.r.t. other criteria might subsequently make that first criterion look unimportant after all.) "First criterion" may be "immediate domestic political interest" and pressure of time may be such that search is ended when first alternative is found that is satisfactory w.r.t. that.
(c) Risk of "time running out" if level of acceptance is set too high to avoid risk (a).

Conservatism

Extreme conservatism: $p \sim 0$, $\alpha \sim 0$.

Looks "reasonable" in case like

	A	B
I	0	-100
II	-10	-10

where picking II means acting "as if" at least 10% prob. were assigned to "worst case" B.

But looks "unreasonable" with:

III	0	-100
IV	-90	-90

where picking IV means acting "as if" B had 90% prob (really inconsistent with "uncertainty.")

~~But~~ "Expecting the worst" may or may not be conservative in the sense of "favoring the status quo." (It favors s.g. to extent that range of outcomes for s.g. is same as for alternatives; s.g. will have less ambiguity, so its bad outcomes may get less weight. But if s.g. has some worse outcomes, and its outcomes are equally ambiguous, "expecting the worst" will favor change). A "conservative" will tend to favor status quo by inflating its payoffs — but this still may not make it look preferable in terms of "reasonable" or "conservative" expectations.

When s.g. payoffs are "inflated," someone else whose payoffs are "realistic" may find it "necessary" to give an exaggerated estimate (in his own view) of the prob. of the "worst" possibility, to get "conservative" administration to act: to take out "insurance" (bureaucracy acts only when this is clearly preferable to a wishful estimate — in terms of payoffs and likelihoods — of results of inaction.) It doesn't actively "insure" on basis of realistic or "hypothetical" estimates.

This may not succeed in shifting "official" estimates to a point where administration acts, buys insurance. (where "insurance" implies some element of "conservation", of biassing expectations toward worst possibility to account for uncertainty of estimate, and/or curvature of utilities).

But it may 1) shift official estimates in direction of "pessimism";
2) make it embarrassing for estimators to change their estimate when new actions are at stake.

Thus, in new situation, the "pessimistic" estimate may now favor the status quo action, and will be used by administration to justify inaction; while (Alcop) would now prefer to have them "realistic" or even "wishful."

More generally; in controversy, it is advantageous to exaggerate an estimate of likelihoods in such a way as to cause decision-makers to take action you prefer (on basis of your payoffs, realistic guesses, uncertainty and conservation); (it is easier to affect their estimates of likelihood than their payoffs, uncertainty or degree of conservation).

But if actions/payoffs change — new decision problem — you ^{might} ~~would~~ prefer to exaggerate estimates of prob. in a different direction, to influence their behavior; only to find that your own previous estimates — which were designed to stir you to action, now serve as excuse ~~and~~ actually and incentive for inaction ~~see~~; and you can't wipe out their effects, or even try hard to do so without discrediting earlier advice.

(Suppose you thought X was "really" 5% likely, but "conservatively" ~~set~~ assign it 10%, believing that it definitely is not more than 15%. If you say it is 10-15%, you will not later be embarrassed to say it is not more than 15%. But if you say it is 30% — to get action out of someone who will only act if it is at least 25%, you will later be embarrassed to say it is no more than 15%; and you may have convinced you it is at least 20%.

On missile estimates:

	SU	100	2000
Buy 1000		+10	-80 ⁽⁻³⁰⁾
S-9: Don't buy		0	-100

My payoffs: I would Buy if I assigned 10% or more ^{wight} ~~prob~~ to SU-2000. I "actually" assign 5%, but ~~prob~~ ^{prob} ~~5%~~ "conservatively" assign 10%.

But gov's payoffs are:

	100	1000
Buy	-60	-60
Don't buy	0	-100

~~then~~

(They think danger of inflation is as great as danger of war.)

They will buy only if they assign $>.6$ wight to 2000.

So I say: likelihood is .5, conservatively say .6.

Result: Their initial expectation was 1%; ~~then~~ I shift them up to 50%; they don't buy. Then we face Munich/Berlin.

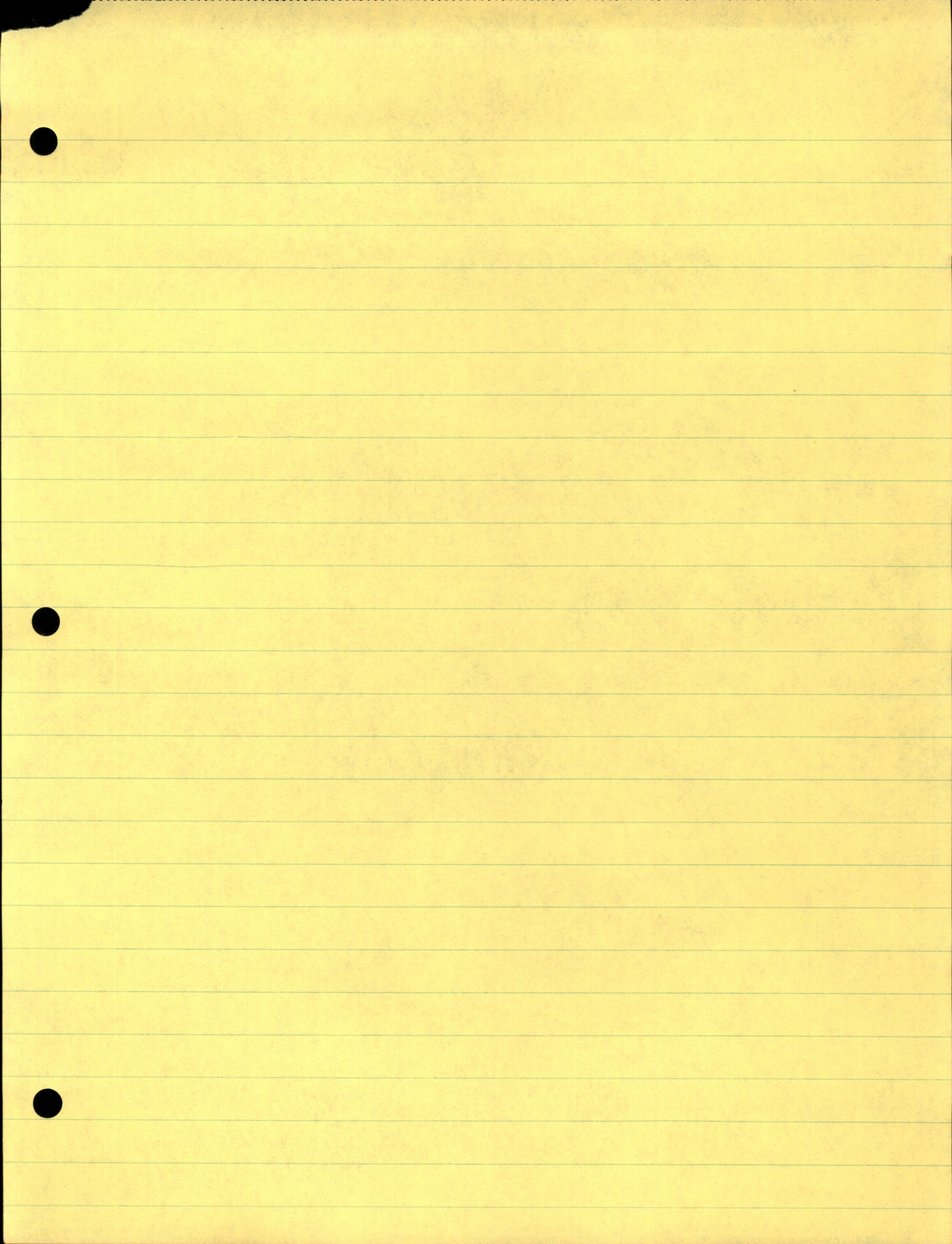
	100	2000
Fight	0	-100
S-9 Surrender	-80	-80

My expectation is same as before; I would Fight if I assigned less than 80% wight to SU-2000; and I actually assign less than 15%. But gov payoffs are

Fight	0	-100
Surrender	-40	-40

then will Fight only if $pr(SU-2000)$ is $< 40\%$; but

thanks to my earlier efforts, they assign 50%, and I can't get them down, even by claiming prob. is less than 5% (which just discredits me).



Insurance:

Insurance involves "taking into account" "another" contingency, i.e. a contingency other than ~~the~~ one which otherwise would be the basis for action (e.g. the "most likely"). It involves recognizing uncertainty, possibility of more than one outcome. "Taking into account" means looking at outcomes under that contingency, at least improving them when this is "free," (in terms of other outcomes) and perhaps improving them at some expense to others.

Usual emphasis on insuring against worst contingencies; assumption that one should be or is usually willing to "pay" more than the expected improvement in objective outcome; corresponds to assumption that negative outcome or loss has convex utility. (Similar assumption for gain $\Rightarrow$ "insure" against "good" contingencies only if expected objective improvement is more than cost of insurance). Rule of "expecting the worst" may be a rule-of-thumb way of allowing for convexity of utility (if applied to objective outcomes; but this wouldn't vary with ambiguity).

My decision rule, with $\alpha = 0$, has possible drawbacks: a) Will tend to favor inaction, status quo, when all "actions" have ambiguous risks and inaction seems to involve no risks; or may rule out all actions with a chance of positive outcome, since there are also associated with negative outcomes. b) May bias against seeking information, since likelihood that information acquired will be "useless" is exaggerated.

Cautionary / otherwise advice on combat commander can be interpreted either as 1) "act as if α were large," or 2) "act as if p were large."

WHY ARE PEOPLE GENERALLY "UNDERINSURED"?

RAND as "insurance salesman."

FORMS of INSURANCE: Contingency plans, alerts, check-lists (including Do's), SOP's
Cross-training, communications, sensors RECON/SURVEILLANCE

PROP: Neon info was worth more to Ike than it would be to Pres. AJW. (and Ike was willing to spend heavily).

$p = \frac{1}{10}$

	10	500
Buy 500	-40	-60 - (Rational bankruptcy)

Buy 50	0	-100
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If Buy 500: If $\text{prob}(500)$ is $> .5$ before neon, Buy 500

Value of info: $\text{prob}(\text{neon}=10) \cdot 40 + \text{prob}(\text{neon}=500) \cdot 0$

if a priori $\text{prob}(\text{neon}=10) = .5$, value of info = 20

If Ike's own $\text{prob}(\text{neon}=10)$ is $.10$, value to him is 40.

If Buy 50: Value of info = $.9 \times 0 + .1 \times 40 = 4$

To AJW	10	500
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Buy 50	0	-100
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Buy 500	-10 (+10)	-20
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AJW's prob. that $(\text{neon}=10) = .1$

Value of info = $\text{prob.}(\text{neon}=1) \cdot 10 + \text{prob.}(\text{neon}=500) \cdot 0$
 $= 1$

If "otherwise" we Buy 50: Value = $.1 \times 0 + .9 \times 80 = 72$

= Value to AJW "outside" the gov

Minsky's paper on heuristic programming

[The "dumb" aspect of "conditioning" is that one cue is not always a good "indication" that the response appropriate to the associated cue is appropriate; conditioned animal looks "stupid" to extent that it fails to have a good "statistical decision theory" relating info/indications to consequences of its actions.]

In a period of great ambiguity (e.g., post-attack, crisis) expect a) great variation in individual expectations, but b) not randomly distributed; rather, & "organized" corresponding to the wishes of sub-groups. c) great effect upon expectations of 1) new information, or 2) changes in payoffs, wishes.

If situation is one of absence of info rather than mass of conflicting or private info, then dissemination of a strong, "plausible" authoritative line might have great effect in coordinating expectations.

Insurance reduces need for — value of — certain kinds of info; but increases value of other kinds (assured survival of system makes certain info relevant).

Systems analysis has generally underestimated the uncertainty of estimates of the enemy's payoffs, alternatives, & "systems analysis." as well as his ignorance, rigidity, multiple pressures, etc.

Winter, P-2416, Economic Recovery from TN War

"It is clear that within the next decade or two, war could occur where any particular type or degree of preparation might be (1) not needed. 2) helpful but not essential. 3) Essential for the avoidance of substantial additional population losses and for social recovery. (4) Worthless, because hopelessly insufficient." p. 6

"In deciding whether any given measure of preparation should be undertaken, we have to ask whether making the preparation will affect the probability that they will be needed. Depending on the measure and the way it is carried out, I believe that this effect can go either direction. If it is of substantial magnitude, this consideration will probably dominate. Otherwise, we must ask whether the measure is a good buy considered as insurance. This means asking whether the range of situations for which the measure would be helpful or essential is sufficiently broad to justify the expenditure. It does not mean asking whether the measure will be valuable in every conceivable war that could occur, or whether a war in which the measure would be valuable is certain to occur; no insurance policy pretends to cover every contingency." p. 6-7

"Pessimism": Duration: how long it might take to restore GNP to prewar level, in per capita terms & "I consider a case where the full population survives and half the economy's capacity is destroyed. This is clearly unrealistic, but the relative balance between surviving industry and population is on the pessimistic side here, and the results of the following calculations in per capita terms depend only on the relative balance." p. 26

Winter: D-8662 Issues of Ec Collapse

Distinguishing achieving flexibility (50 buttons for MM) from preserving it (e.g. avoiding early
[Cost of "flexibility" may be cost of preserving alternatives, of
avoiding otherwise-automatic "commitment"]

"Resources cannot be stored at zero cost, and some positive level
of activity (other than storage) is therefore required in order to keep
open the option of beginning recovery with some given bundle of surviving
resources. By far the most important storage cost the economy must meet
is the support of the population. Unless minimum requirements for food and
water, shelter & heat, clothing & sanitation are met, the population will
begin to freeze, starve, or die of disease. This will quickly eliminate
any possibility of recovering preattack output levels in two decades or less."

p. 33

[Other assets that decay rapidly ^{in utility} unless "maintained" by costly
processes; information about current environment, consequences of
alternative actions, set of available actions.

Decision makes, communications decay rapidly under attack,
unless protected; also forces; tankers, fuel; recovery bases.

Enemy values under threat by given US reserve capacity
decay during exchange unless special effort made to minimize collateral
damage in initial attacks.

If contingency plans are not kept up to date; alternative target
folders...

Use of reserves (e.g. by decentralized commands).

In all these cases, automatic commitment — "autonomous" shortening of
range of 'interesting' alternatives — occurs as result of "natural" or "outside" factors
causing "decay of alternatives set": change over time, enemy attack, effects of our own attack.

Nintin [Why systems analysts are so successful]

Notion of latent technology. "includes ways of doing things that were unknown preattack, or else so far from being economic preattack that their existence is more or less forgotten, but whose existence will become apparent when the postattack situation is actually faced." p. 12

Given shifts in capacity & demand after war, "a great many technological problems whose existence was never even imagined are going to appear, and an effort will be made to solve them (all the easy problems that are interesting given the existing pattern of scarcities may have been solved. A drastically different pattern of scarcities ["payoff for"] sets up a whole new set of easy problems that have not been solved because they received no attention.)" 12

(theory of profitability and perceived need as influencing direction of technological change.)

Problem of the defensible estimate, persuasive or defensible even before a hostile and intelligent audience (as opposed to "best guess").

normative $\rightarrow$ descriptive

conform $\rightarrow$ pros

don't conform $\rightarrow$ foolish

Fid comply $\rightarrow$ not foolish

Don't describe; predict, explain, prescribe

Ambiguity $\rightarrow$ special behavior $\rightarrow$ violations